

Brucellosis Investigation Guidelines

CONTENTS

Investigation Protocol:

- **Investigation Guideline**

Investigation Forms / Documentation Worksheets:

- **Investigation Form**
- **Documentation Checklist**
- **KS Notifiable Disease Form**

Supporting Material:

- **Sample Letter, Generic to Case**
- **Sample Letter, Generic to MD**
- **Fact Sheet**

Brucellosis

Disease Management and Investigative Guidelines

CASE DEFINITION

A. Clinical Description for Public Health Surveillance:

Brucellosis is an illness characterized by acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache, and arthralgia.

B. Laboratory Criteria for Diagnosis:

- Isolation of *Brucella* spp. from a clinical specimen, or
- Fourfold or greater rise in *Brucella* agglutination titer between acute and convalescent phase serum specimens obtained ≥ 2 weeks apart and studied at the same laboratory, or
- Demonstration by immunofluorescence of *Brucella* spp. in a clinical specimen.

C. Case Classification:

- Confirmed: A clinically compatible illness that is laboratory confirmed.
- Probable: A clinically compatible case that is epidemiologically linked to a confirmed case or that has supportive serology (*i.e.*, *Brucella* agglutination titer ≥ 160 in one or more serum specimens obtained after onset of symptoms).

D. Laboratory Tests:

The State Public Health Laboratory does not provide testing and sends all isolates to the CDC. Specimens sent to CDC must have prior authorization from the State Epidemiology Program before they are processed.

- Laboratory Kit: Miscellaneous infectious substance.
- Specimen: Call for specific information.
- Amount: Call for specific information.
- Remarks: For additional information and/or questions concerning isolate collection, sample transport and laboratory kits call (785) 296-1620. An online manual of laboratory tests is also available at <http://www.kdhe.state.ks.us/labs/links.html>

E. Bioterrorism Potential:

Brucellosis is a potential bioterrorism weapon. If the case has no remarkable travel history and is not employed in an occupation that is prone to exposure, then a bioterrorist event should be considered. If you suspect that you are dealing with a bioterrorism situation, contact the Local Health Officer, on-call epidemiologist (local) and KDHE (1-877-427-7317) immediately.

F. Outbreak Definition:

There are no formal outbreak definitions; however, the investigator may consider the possibility of an outbreak when ≥ 2 cases, in different households, are clustered in time and/or space or when the epidemic threshold is exceeded for the community.

INVESTIGATOR RESPONSIBILITIES

A. Investigation Related Tasks and Activities:

- Conduct an epidemiological investigation to identify the possible source of infection and to locate additional cases and/or contacts in the community.
- Identify the source of infection and prevent further transmission from this source (e.g., infected animal, contaminated unpasteurized dairy product, etc.).
- Report all confirmed and probable cases to the Bureau of Epidemiology & Disease Prevention, Disease Surveillance using HAWK or the Notifiable Disease Form (Fax 1-877-427-7318).
- Potentially exposed individuals should be followed for symptoms of infection 2x/month for 2 months.

B. Notifications:

- There are no special notifications or additional reporting requirements.
- Mail or deliver notification letter and/or disease fact sheet to case, contacts and other appropriate individuals or groups (if appropriate and/or requested).

EPIDEMIOLOGY

Brucellosis is a zoonotic disease of both wild and domestic animals; humans are accidental hosts. It is most commonly seen in farmers, ranchers, veterinarians, and others who work directly with animals. Employees in certain types of laboratories, slaughterhouses and meat inspectors may also be infected. Sporadic cases and outbreaks may occur among consumers of unpasteurized milk and milk products, especially soft cheeses. In the United States <120 cases are reported annually.

DISEASE OVERVIEW

A. Agent:

Brucellosis is caused by the small, nonmotile, gram-negative coccobacillus. Several species of *Brucella* infect humans including: *B. abortus*, *B. melitensis*, *B. suis*, and *B. canis*.

B. Clinical Description:

Acute or insidious onset with fever, headache, weakness, sweating, chills, arthralgia, depression, weight loss and generalized aching. Relapses are common in untreated persons. Lymphadenitis, splenomegaly and hepatomegaly are common but jaundice is rare. Symptoms may last from weeks to years and diagnosis is often difficult. Fatalities are rare.

- **Differential Diagnosis:** Febrile illnesses without localizing signs, such as infectious mononucleosis, lymphoma, malaria, and typhoid.

C. Reservoirs:

Reservoirs include sheep, cattle, swine, and goats. Bison, elk, caribou, and deer may also harbor *Brucella* species. *B. canis* is an occasional problem associated with laboratories and dog kennels.

D. Mode(s) of Transmission:

Transmission occurs through direct contact with infected animals and/or tissues including: blood, urine, vaginal discharges, aborted fetuses, and placentas. It may also be transmitted through consumption of unpasteurized milk and/or dairy products from infected animals. Airborne transmission may occur through inhalation of aerosols in laboratory settings and may also occur through accidental self-inoculation of the brucellosis vaccine.

E. Incubation Period:

Variable incubation period, ranging from 5-60 days but may be several months; illness most commonly occurs about 1 month after exposure.

F. Period of Communicability:

Person-to-person transmission is rare. Animals may remain infectious for years.

G. Susceptibility and Resistance:

Unknown, but most people are considered susceptible. Duration of acquired immunity is uncertain.

H. Treatment:

A combination of rifampin or streptomycin and doxycycline for at least 6 weeks. Corticosteroids may be helpful for severely ill cases.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

A. Identify Potential Source of Infection:

Standard investigation protocol includes completion of the case identification, demographics, basis of diagnosis (*i.e.*, case definition), and risk factor sections of the Brucellosis investigation form. Further investigative activity should concentrate on the following:

- Recent undiagnosed illness.
- Occupation and location: farmer, dairyman, slaughterhouse worker, butcher, persons handling animals and animal by-products.
- Contact with cattle, swine, goats, sheep, horses, and dogs.
- Use and source of unpasteurized milk, other dairy products or imported foods, especially cheese.
- Travel history for 10 months prior to onset.

- Determine what laboratory tests were conducted and their results to verify the diagnosis. If possible obtain copies of the laboratory reports as disease confirmed by isolation of the *Brucella* species may help narrow the potential source of infection.
 - *B. canis* is often associated with dogs.
 - *B. melitensis* has become the major cause of human Brucellosis in Latin America and is often associated with goats and their dairy products.
 - *B. melitensis* is often associated with bison, elk, caribou, deer, and swine.

B. Identify Potential Exposed Individuals / Populations (Contacts):

Assess if household or other close contacts are, or have been ill.

Symptomatic household, associates, or co-workers should be strongly urged them to contact their physician for a medical evaluation.

C. Isolation, Work and Daycare Restrictions:

None.

D. Follow-up of Cases:

None.

E. Protection of Contacts:

- No vaccine or treatment is necessary as person-to-person transmission is rare.
- Potentially exposed individuals should be followed for symptoms of infection 2x/month for 2 months.

F. Environmental Measures:

- Pasteurize all milk and dairy products.
- Exercise care when handling placenta and fetus from aborted animals. Disinfect contaminated areas with a bleach solution or other commercial disinfectant.

G. Education:

- Public education on the potential hazards of drinking or eating unpasteurized milk products.
- Educate high-risk workers (*i.e.*, farmers, slaughterhouse workers, etc.) about the risk of brucellosis and stress methods to reduce occupational exposure such as proper ventilation, appropriate carcass disposal and barrier precautions.

MANAGING SPECIAL SITUATIONS

Bioterrorism:

Brucellosis has been proposed as a biological warfare agent. An attack may take the form of dissemination of an aerosol among a gathering of a

large number of people or by the contamination of food or water. An announced threat of dissemination should be taken seriously and the following agencies notified immediately in order of priority as shown:

- KDHE on-call epidemiologist 1-877-427-7317
- CDC Bioterrorism response coordinator 1-404-639-0385
- FBI Duty Officer 1-816-512-8200

A. Safety Considerations for Public Health and Other Health Care Professionals:

Because brucellosis is rarely transmitted person-to-person, public health, other health care, and emergency response personnel are not likely to be at risk during the investigation of an announced threat or the investigation of a scene implicated in an unannounced outbreak.

B. Definition of the Population-at-Risk:

Defining the population-at-risk is essential to guide response activities. Public health authorities will play the lead role in this effort, but will consult with law enforcement, emergency response and other professionals in the process. The definition of the population-at-risk may have to be re-evaluated and redefined at various steps in the investigation, assessment and response to a bioterrorist event. Once the mechanism and scope of delivery has been defined, the identification of the symptomatic and asymptomatic exposed individuals can be completed and recommendations for the treatment and/or chemoprophylaxis made.

C. Specific Control Measures Include:

- Decontamination: Rarely necessary, even in announced threats. However, if there is a high level of suspicion that individuals have been contaminated they should shower with soap and water immediately. Clothing, shoes and personal articles should be placed in a plastic bag, sealed, and labeled with the person's name and contacting information.
- Post-exposure prophylaxis: In most brucellosis threat situations post exposure prophylaxis is not recommended. However, if the level of suspicion is high, exposed individuals may begin antimicrobial therapy if a definitive determination cannot be made within 5 days. The recommended treatment is: rifampin (600 mg/day) and doxycycline (200 mg/day) for 6 weeks.
- Isolation: None.
- Quarantine: None.
- Line lists: A central responsibility of the investigative staff is to maintain detailed line lists of cases, suspect cases, exposed, and potentially exposed individuals with accurate identifying and locating information as well as appropriate epidemiological information. These lists will be essential for early identification of infection among the exposed.

- Pharmaceuticals: In the event of an outbreak of brucellosis, adequate quantities of appropriate antibiotics will be obtained from the Strategic National Stockpile Program. Procurement, storage, and distribution will be coordinated through the Kansas Department of Health and Environment. Local and state public health officials must play a central role in determining which individuals should have priority for receipt of limited pharmaceuticals.

ADDITIONAL INFORMATION / REFERENCES

- American Academy of Pediatrics. 2003 *Red Book: Report of the Committee on Infectious Disease, 26th Edition*. Illinois, Academy of Pediatrics, 1997.
- Chin. J., ed., *Control of Communicable Diseases Manual, 17th Edition*. Washington, DC, American Public Health Association, 2000.
- Kansas Department of Health and Environment, Bureau of Epidemiology. *Disease Protocols*, 2001.
- Oklahoma State Department of Health, Communicable Diseases Division. *The Epidemiologic Follow-up of Communicable Diseases in Oklahoma*, 2001.
- Missouri Department of Health and Senior Services, Section of Communicable Disease Control & Veterinary Public Health, *Communicable Disease Investigation Reference Manual*. 2001.
- CDC. Case definitions for Infectious Conditions Under Public Health Surveillance. MMWR. May 2, 1997; Vol. 46: RR-10.
- Oregon Health Services Website. Available at <http://www.ohd.hr.state.or.us>
- Commonwealth of Massachusetts, Department of Public Health Website. Available at <http://www.state.ma.us/dph/>
- CDC Website. Available at <http://www.cdc.gov/health/default.htm>
- County of Los Angeles, Department of Health, Public Health Programs and Services, *Communicable Diseases Manual*, June 2003.

Brucellosis

Case # _____

☐ Confirmed☐ Probable☐ Suspect

Report Source

☐ Lab ☐ Hospital ☐ Physician / HCP ☐ Other _____

Reporter Name _____

Primary M.D. / HCP _____

County _____

Report Date / / Phone () - Phone () -

Case Identification

Name: _____
Last First InitialAddress: _____
Street CityZip: - Phone: () - Alternative Contact: ☐ Parent ☐ Spouse ☐ Other _____Name: _____
Last First InitialPhone: () -

Workplace / School / Daycare: _____

Occupation / Grade: _____

Demographics

Gender: ☐ Male ☐ FemaleBirth Date: / / Or if unknown, Age:

Race:

☐ White ☐ Black ☐ Asian☐ American Indian / Alaska Native☐ Native Hawaiian / Pacific IslanderHispanic / Latino: ☐ Yes ☐ No

Clinical Information

Clinical Data Onset date / / Diagnosis date / / Illness duration: days
☐ Derived

Signs and Symptoms

Y N UNK N/A

☐☐☐ Fever Temperature . F / C☐☐☐ Recurring fever Number of attacks Days between attacks ☐☐☐ Sweats☐☐☐ Headache☐☐☐ Fatigue☐☐☐ Arthritis or arthralgia☐☐☐ Loss of appetite (anorexia)☐☐☐ Weight loss with illness☐☐☐ Endocarditis☐☐☐ Osteomyelitis☐☐☐ Orchitis☐ Other, Specify _____☐ Other, Specify _____

Hospitalization

Y N UNK N/A

☐☐☐ Hospitalized for this illness

Hospital name _____

Admit date / / Discharge date / /

Y N UNK N/A

☐☐☐ Died from illness Death date / / ☐☐☐ Autopsy

Laboratory Data

Collection Date / /

Y N UNK N/A

☐☐☐ Brucella species isolation (clinical specimen)☐☐☐ Brucella immunofluorescence positive (clinical specimen)☐☐☐ Brucella titer positive with < 4-fold rise☐☐☐ Brucella titer > = 160 in at least 1 specimen☐☐☐ Brucella titer with = > 4 fold rise (serum pair >2 wks apart)☐☐☐ Confirmed at state or federal public health laboratory

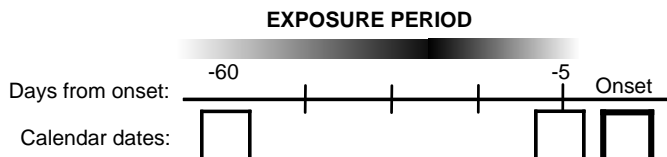
Notes: _____

Laboratory Data cont.

Medication, Treatment, and/or Medical Procedures

Infection Timeline

Enter onset date in heavy box.
Count forward and backward to
calculate probable exposure
and contagious periods.

**Exposure****Y N UNK N/A**☐ ☐ ☐ ☐ Travel out of the county, state, or countryOut of: ☐ County ☐ State ☐ Country

Destinations/Dates: _____

☐ ☐ ☐ ☐ Case knows anyone with similar symptoms☐ ☐ ☐ ☐ If infant, confirmed infection in birth mother☐ ☐ ☐ ☐ Unpasteurized milk (cow)☐ ☐ ☐ ☐ Other unpasteurized milk (e.g. soft cheese from raw milk, queso fresco or food made with these cheeses).☐ ☐ ☐ ☐ Case or household member lives or works on farm or dairy☐ ☐ ☐ ☐ Work with animals or animal products (e.g. research, veterinary medicine, slaughterhouse)☐ Patient could not be interviewed☐ No risk factors or exposures could be identified**Y N UNK N/A**☐ ☐ ☐ ☐ Animal birthing/placentas

Animal, (specify) _____

☐ ☐ ☐ ☐ Wildlife or wild animal exposure☐ ☐ ☐ ☐ Any contact with animals at home or elsewhere☐ ☐ ☐ ☐ Cattle, cow or calf☐ ☐ ☐ ☐ Dog or puppy☐ ☐ ☐ ☐ Goat☐ ☐ ☐ ☐ Pigs or swine☐ ☐ ☐ ☐ Sheep☐ ☐ ☐ ☐ Employed in laboratory☐ ☐ ☐ ☐ Parenteral or mucous membrane Brucella vaccine exposure☐ ☐ ☐ ☐ Foreign arrival (e.g. immigrant, refugee, adoptee, visitor)☐ Other _____☐ Other _____

Notes: _____

Epi-Linkage

During the exposure period, was the case...

Y N UNK N/A☐ ☐ ☐ ☐ Associated with a known outbreak?☐ ☐ ☐ ☐ A close contact of a confirmed or probable case?

Notes: _____

☐ Case could not be interviewed ☐ No risk factors or exposures could be identified

Most likely exposure/site: _____ Site name/address: _____

Where did exposure probably occur? ☐ In State, County: _____ ☐ Out of state ☐ Not in US ☐ UNK

Public Health Actions

☐ Other, specify: _____

- ☐ Hygiene education provided
- ☐ Restaurant inspection
- ☐ Child care inspection
- ☐ Work or child care restriction for household member
- ☐ Exclude from high-risk occupation (e.g., foodhandler, daycare, etc.) or situations diarrhea ceases / stool sample negative
- ☐ Initiate contact investigation
- ☐ Other, specify: _____
- ☐ Other, specify: _____

[illegible]

Estimated investigation time (hrs) .

Investigator name _____ Phone (____)____-____

Signature _____ Investigation complete date

 /

 /

Brucellosis Investigation and Documentation Checklist

TASK	DATE	INITIAL
Report Received:	____/____/____	_____
Health Officer and State Notified:	____/____/____	_____
Assigned to Investigator:	____/____/____	_____
Reported to State Surveillance System:	____/____/____	_____
Met Case Definition: <input type="checkbox"/> Yes <input type="checkbox"/> No	____/____/____	_____
Case Interview Completed: <input type="checkbox"/> Yes <input type="checkbox"/> No	____/____/____	_____
MOGE Reason: _____		
Biologic Sample to CDC Laboratory: <input type="checkbox"/> Yes <input type="checkbox"/> No	____/____/____	_____
Additional Exposures Identified? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> None	____/____/____	_____
Names: _____		

Active Surveillance on Exposed Person(s) Bimonthly x 2 months	____/____/____	_____
New Case(s) Identified: <input type="checkbox"/> Yes <input type="checkbox"/> No	____/____/____	_____
Names: _____		

Letter/Information Sheet(s) Sent:	____/____/____	_____
Completed Disease Investigation Form:	____/____/____	_____
Case Closed and Filed:	____/____/____	_____
Notes: _____		

Case Name: _____

Number: _____

Principal Investigator: _____

Initials: _____

Case Reviewed By: _____

Date: ____/____/____

KANSAS NOTIFIABLE DISEASE FORM

Today's Date: ____ / ____ / ____

Patient's Name: _____
Last First Middle

Day Phone: _____ Evening Phone: _____

Residential Address: _____

City: _____ Zip: _____ County: _____

Ethnicity: Hispanic or Latino Not Hispanic or Latino Unknown

Race: American Indian/Alaska Native Asian Black or African American
Native Hawaiian or Other Pacific Islander White Unknown
(Circle all that apply)

Sex: M F Date of Birth: ____ / ____ / ____ Age if DOB unknown: _____

Disease Name: _____

Symptoms:

Onset: ____ / ____ / ____ State the 3 most prominent symptoms:

Symptom 1: _____ Symptom 2: _____ Symptom 3: _____

Outbreak associated? Y N Died? Y N

Institutional Residence? None Nursing Home Correctional Residential Hospital Psych

Physician Name: _____ Physician Phone: _____

Laboratory Information:

Specimen Collection Date: ____ / ____ / ____ Date Reported To You: ____ / ____ / ____

Name of Test Performed: _____ Results of Test: _____

Name of Laboratory: _____ Laboratory Results Attached? Y N

Treatment Information:

Date of Treatment: ____ / ____ / ____ Treatment Type and Dosage: _____
Treatment Status: Complete On-going Discontinued

Name of person reporting: _____ Phone: _____

Comments: _____

Mail reports to your local health department or to: BEDP – Disease Surveillance, 1000 SW Jackson, Suite 210,
Topeka, KS 66612-1274. Reports can also be *faxed toll free* to: 1-877-427-7318. (Rev. 04/2004)

Date: _____

Dear: _____,

I am writing to you in regards to some recent laboratory test results that you should have received. I work with the Local Health Department, as part of my job, I provide information and answer questions about certain diseases that are reportable to us. * I would like to speak to you about your laboratory tests and provide information to you as well as to obtain some additional information about your results. Everything we receive from you or your healthcare provider is **STRICTLY CONFIDENTIAL**. The purpose of us collecting this information is to educate patients and to collect information for public health planning and support our disease prevention activities.

Please contact me at your earliest convenience so that we may discuss this matter further. If your health care provider has not yet discussed this with you, I would encourage you to make an appointment or call them as soon as possible.

I look forward to discussing this matter with you and will be happy to answer any questions that you may have regarding this investigation at that time. My telephone number is _____. Thank you in advance for your assistance.

Sincerely,

*The Kansas Department of Health and Environment (KDHE) has the authority to define what diseases shall be regarded as dangerous to the public health and to require the reporting of such diseases. Under this authority KDHE has established regulations making certain diseases reportable (K.S.A. 65-118 and K.S.A. 65-128, and amendments thereto). These regulations outline reporting requirements and control measures that apply to both confirmed cases of such diseases and contacts of confirmed cases. Local health departments are required to collect information for the KDHE and implement control measures.

Date: _____

Dr: _____,

I am writing to you in regards of your patient, _____. The Health Department recently received notice that this patient may have been diagnosed with _____, which is a reportable disease under State rules and regulations. The Health Department routinely contacts patients with reportable diseases to gain more information, provide education, and make necessary referrals and support. In order to do this, I would like to speak to you regarding the laboratory results and risk history of this patient.

Please contact me at your earliest convenience so that we may obtain the information required for this report. If it is more convenient for you to fill out the report form on your own and send it to me, please feel free to do so. I have enclosed a copy of it with this letter. I would also like to remind you that during our investigation we may be contacting your patient directly, it is strongly recommended that you contact your patient to discuss this diagnosis and inform them of our investigation. All of the information that we obtain from either you or your patient is **STRICTLY CONFIDENTIAL**.

I look forward to discussing this matter with you and will be happy to answer any questions that you may have regarding this investigation at that time. My telephone number is _____. Thank you in advance for your assistance.

Sincerely,

*The Kansas Department of Health and Environment (KDHE) has the authority to define what diseases shall be regarded as dangerous to the public health and to require the reporting of such diseases. Under this authority KDHE has established regulations making certain diseases reportable (K.S.A. 65-118 and K.S.A. 65-128, and amendments thereto). These regulations outline reporting requirements and control measures that apply to both confirmed cases of such diseases and contacts of confirmed cases. Local health departments are required to collect information for the KDHE and implement control measures.

	Public Health Fact Sheet Brucellosis
--	-------------------------------------------------------

What is Brucellosis?

Brucellosis is a disease caused by the bacteria *Brucella*. It mainly affects sheep, goats, cattle, deer, elk, pigs and dogs. People who have contact with infected animals may become sick. Although brucellosis is rare in the United States, it is often found in other countries.

How is Brucellosis spread?

People can become infected with *Brucella* through a break in the skin that is in contact with animals that are contaminated with the bacteria. It may also be spread by eating or drinking unpasteurized milk, cheese and ice cream that came from infected animals. Brucellosis is not easily transmitted from person-to-person.

Can *Brucella* be used for bioterrorism?

The Centers for Disease Control and Prevention lists *Brucella* as a possible bioterrorist agent; however, it has never been successfully used in this manner.

What are the symptoms of Brucellosis?

Brucellosis has a wide range of symptoms, some of these are similar to the flu and include: fever, chills, sweats, headaches, muscle aches, joint pains, back pain, and physical weakness. Brucellosis may also cause long lasting symptoms including recurrent fevers, joint pain, and fatigue.

How soon after exposure do symptoms appear?

Symptoms can appear anywhere from 5-60 days after exposure to the bacteria; most people start to show symptoms within 21-28 days after exposure.

How is Brucellosis diagnosed?

The diagnosis is made by laboratory testing of blood, bone marrow and other tissues.

How is Brucellosis treated?

Brucellosis is treated by taking antibiotics for up to 6 weeks to prevent re-occurring infection. Recovery may take a few weeks to several months. Death rarely occurs.

Is there a vaccine for Brucellosis?

There is no vaccine against Brucellosis currently available for humans; however, there is a vaccine available for animals.

How can I prevent Brucellosis?

Do not eat or drink unpasteurized milk, cheese or ice cream. If you are not sure whether the dairy product is pasteurized, do not eat or drink it. Hunters and farmers should use rubber gloves when handling dead animals.

Where can I get more information?

- Your Local Health Department
- Kansas Department of Health and Environment, Epidemiologic Services Section (877) 427-7317.
- The Centers for Disease Control and Prevention website
<http://www.cdc.gov/health/default.htm>
- Your doctor, nurse, or local health center.